Life Cycle of an Object

W534 – Bird Coffin

Introduction

W534, a bird coffin, currently resides in the animal case of the House of Death, The Egypt Centre, Swansea. The coffin came to Swansea in 1971, having been donated by the Wellcome Trustees. The Egypt Centre have dated it from between the Late Dynastic to the Graeco-Roman Period.[1] It was constructed from a yellowish wood of poor quality with a coarse grain.

Description

Dimensions

The bird coffin measures 436mm length by 139mm width at its largest point. The ventral cavity[2] measures 330mm length by 68mm width, reaching a depth of 67mm from where the panel would be fitted. The head is 104mm height, making up 23.85% of the entire body. The beak then measures 22mm, 21.15% of the size of the head. The holes in the legs are of uneven proportions, both being 17mm in length but the right hole being 16mm width compared to the 12mm width of the left hole.[3]

Table 1 – Dimensions of W534 – Measurements taken by Author

Feature	Length	Width (largest)	Width (smallest)	Height	Depth
Body	436mm	139mm			
Tail		104mm			
Head		80mm		104mm	
Beak		27mm		22mm	
Left leg hole	17mm	12mm			
Right leg hole	17mm	16mm			
Ventral cavity	330mm	68mm	39mm		67mm

[1] The Egypt Centre, 2005.
[2] See Figure 1.
[3] See Figure 2 and Figure 3.

Brief Description

The piece is a yellowish wood[4] carved to into a zoomorphic shape and coated in paint. The paint varies between features, some being black and other sections being red.[5] The lack of paint on the top of the head[6] may simply be an abrasion, however, due to the circular nature of the deficient, is perhaps more likely to be an area that had been covered up prior to painting and is now missing this element. This is further supported by the dowel, indicating that something was once connected to this piece, likely a headdress. This assumption can be made from parallels, OIM E154B of Chicago's Oriental Institute having similar holes in the head[7] for such a purpose and A423000-0 of the Smithsonian's object file stating:[8]

> **Remarks** From NMNH Exhibit Hall "Eternal Life in Ancient Egypt" label for this artifact, 2011: Mummified falcon in coffin, 332-30 B.C. This wood coffin originally had legs and a sun disc emerging from the head to identify it with a sun god. A falcon mummy is still tucked in a recess in the back.

The cavity in the back of the coffin was intended to hold a mummy, which is currently held separately in the Egypt Centre and accessioned to W534B[9]. With this placed inside, a ventral panel would be placed over the top, sealing the piece, however, this is currently missing.[10] The legs, indicated by the peg holes[11], are also missing, as is the case with OIM E154B and A423000-0. However, they are present in CG 29793 and CG 29794[12], giving some indication of what they may have looked like. Finally, the tail finishes the coffin, but now features a large fracture[13]. Due to the lack of residue in the crack, it can be

[4] See Figure 4.
[5] See Figures 5 and 6.
[6] See Figure 7.
[7] See Figure 8 for OIM E154B as it currently is and Figure 9 for a potential reconstruction.
[8] Smithsonian National Museum of Natural History, 2014. Object file acquired through personal communication, providing further details than those featured on the website. See Appendix 2 and Figure 10.
[9] The Egypt Centre, 2005.
[10] Ikram, 2005, p. 11.
[11] See Figure 3.
[12] See Figure 11.
[13] See Figure 12.

ascertained that it was not done prior to application of paint or resins in the workshop, however, it is indeterminable as to whether this is a modern fracture or if the damage occurred in antiquity.

Identification

To understand the Egyptian perspective of the object, the bird type must be identified, as different avian species may hold different connotations. Using ornithological techniques to look at size, shape, colouring, bills and other features, at very least the family can be determined, if not a specific genus.[14] Given the cavity size being 330mm by 68mm, the mummy interred within must have fit within these measurements, however, desiccation and binding must be accounted for and perhaps a reduction of size anticipated between the living compared to the mummified bird. There is also the possibility that the coffin shape may not be entirely realistic of the bird within, but rather an idealized representation. The beak[15] is highly indicative of the classification of the bird, the falconidae family having the hooked beak to deliver powerful bites and sever the spinal cord in order to kill their prey.[16] This classification is also supported by other facial features, such as the shape of the eyes and proportion to the supraorbital ridge.[17] All of this, combined with the apparent upright position[18] being closely representative of Gardiner's sign G5 make it apparent that this bird is likely intended to be characteristic of the so called "Horus Falcon", forming a close association with Horus.

Dating

There are many different ways of dating, however, not all are available in this instance. Absolute dating can take many forms, the most common being calendars and historical

[14] Wyatt, 2012, p. 83.
[15] See Figure 13.
[16] Sustaita & Hertel, 2010, p. 2617.
[17] Bailleul-LeSuer, 2012, p. 187.
[18] Houlihan & Goodman, 1986, p. 46. See Figure 14.

chronologies, tree-ring dating and radio-carbon dating.[19] However, as there is no set chronological point, such as a name, associated with the piece, no tree-rings and no access to radio-carbon dating, relative dating must be used. As the object has no known associated records *in situ*, stratigraphy based dating is not an option. Neither climatic dating nor pollen dating are applicable in this case either. After eliminating these possibilities, the only methods left are by seriation and typologies.

Table 2 – A sample of 200 raptor burials organized by time period and coffin material – See Appendix 1 for all examples included within the sample. See Figure 15 for visual representation of this in the form of a frequency seriation graph.

	No Coffin	Wooden Coffin	Bronze Coffin	Pot Burial	Limestone Coffin
Graeco-Roman Period	43	29	17	37	14
Late Period	12	1	11	29	
Third Intermediate Period					
New Kingdom	2		1		
Second Intermediate Period					
Middle Kingdom					
First Intermediate Period					
Old Kingdom	2				
Early Dynastic					
Predynastic	2				

It must be noted, however, that many factors may influence those included within the sample. The popularity of raptor burials may change over time and the age and location of a deposit may affect what survives. There is also always the possibility of wild animals moving or destroying remains, particularly in shallower burials. The fragility of avian bones must also be considered, the embalming practices of earlier times perhaps being too damaging to produce many successful mummies to be interred.[20] This being said, the data seems to support the coffin fitting within the Graeco-Roman period. This is further sustained by the

[19] Renfrew & Bahn, 1991, p. 128.
[20] Linseele, Neer, & Friedman, 2009, p. 119.

dating of parallels,[21] OIM E154B being dated to the Graeco-Roman period[22] and A423000-0 being more specifically dated to 332-30 B.C.[23], the Greek period of Egyptian history.

Materials

Wood

With wood being the most prominent material used in the coffin, it is crucial to identify it. It appears to be a coarse wood of low quality with yellow-brown colouring[24], fitting the description of sycomore fig well. [25] This may also fit the characteristics of turkey oak, lime or date palm. However, due to the tensile strength of turkey oak, lack of either native distribution or attestation of imports of lime, or the primary usage of date palm being that of architectural or statuary, sycomore is more likely.[26] This is further supported by the extensive use of sycomore fig in the production of coffins throughout Egyptian history[27] and its distribution as a native tree.[28] Parallels are also provided through CG 29793 and 29794, both also constructed from sycomore fig wood.[29]

Paint

The use of paint would have been of great importance to the piece when first produced, though what remains is fragmentary. However, from the remnants it is possible to theorise

[21] This comparison of parallels is also known as "cross-dating", and is based on the premise that if one object has a set date, another similar object may be of an approximately similar age. Brewer, 2012, p. 15.
[22] Bailleul-LeSuer, 2012, p. 186.
[23] Smithsonian National Museum of Natural History, 2014.
[24] See Figure 4.
[25] A large part of this section is based on Gale, Gasson, Hepper, & Killen, 2000. Sycomore is spelt in this manner in order to differentiate it from the European or American varieties of sycamore, with which is shares few commonalities. Page numbers for each wood type are as follows: Sycomore: p. 340.; p. 348.; Oakley, 1932, p. 158. Turkey oak: p. 344. Lime: p. 345-346. Date palm: p. 348.
[26] Further significance to the use of sycomore is the possibility of W534 being a votive offering to Horus, to whom Hathor, the "Mistress of the Sycomore", was sometimes consort. Vischak, 2000, p. 82.
[27] Davies, 1995, p. 150.; Hepper, 2009, p. 59.
[28] Gale, Gasson, Hepper, & Killen, 2000, p. 340.
[29] Gaillard & Daressy, 1905, p. 141-142. While this source is outdated, the coffins were still mentioned as present in the museum in Bailleul-LeSuer, 2012, p. 188. despite being omitted from the partial catalogue of Ikram & Iksander, 2002.

what the finished piece could have looked like. The coffin features both red[30] and black[31] paint. In the creation of ancient Egyptian paint, there are two essential components: a pigment and a binder.[32] In this case, the pigment would have been either iron oxide or red ochre[33] and some form of carbon[34] respectively. While the binder cannot be ascertained without either liquid/gas chromatography or mass spectrometry, it can be speculated upon. The possibilities are derived from plant gums, animal glue, egg white, beeswax or natural resins.[35] Given the thickness of the paint producing visible layers on the wood[36], while retaining the pliability required for application and availability for the period, only plant gums or animal glues are left. No distinction can be made for certain without chemical analysis, however animal glue was supposedly the most commonly utilized binder.[37] Whilst it is also possible that the use of gesso was employed to cover the low quality timber, thus adding to the thickness, it is difficult to determine without exposed sections.

Adhesive

While the wooden dowels act as connecting pieces, they would not have fully secured the joins of the piece and so some adhesive would have been used in attaching the headpiece and tail. With no remaining residue, it is impossible to ascertain what this may have been, though it is still important to note that it would have been present.

[30] See Figure 5.
[31] See Figure 6.
[32] Newman & Halpine, 2001, p. 22.
[33] Wilkinson, 1994, p. 105; Lee & Quirke, 2000, p. 113-114.
[34] Wilkinson, 1994, p. 106.; Lee & Quirke, 2000, p. 108.
[35] Newman & Halpine, 2001, p. 22-24.
[36] See Figure 16. This may be evident of a protein collagen based binder as opposed to a polysaccharide, such as an animal glue as opposed to a plant gum Newman & Serpico, 2000, p. 475.
[37] Newman & Halpine, 2001, p. 23.

Miscellaneous

While the legs are no longer present, like both OIM E154B[38] and 423000, [39] they were once there, as indicated by the holes on the underside.[40] They would have been made either of metal or of wood, [41] as in CG 29793 and 29794.[42]

Production

With the sycomore fig being a native flora and distributed throughout the Nile Valley, [43] it is difficult to determine precisely where the trees used in the production of the coffin may have originated from. This being said, it does not produce any seed and so reproduction of the tree must be done manually,[44] and thus intentionally. Therefore, whilst it is possible to cultivate sycomore throughout the Nile Valley, it would have limited distribution due to the intensive process from which it is acquired. This also fits twentieth-dynasty texts detailing sycomore gardens, [45] further supporting its finite source. From here, it would have been felled using the 'notch' or 'double-notch' technique while holding ropes to control both speed and direction of the fall[46] and the branches removed.

After felling, the wood would need to be transported, either to the next stage of production itself or to the Nile to allow for further conveyance by ship. Depending on the size of the log, this would be done either by using ropes[47] or baskets.[48] The use of donkeys may also have been employed, as noted in texts of Deir el-Medina during the Ramesside period.[49]

[38] Bailleul-LeSuer, 2012, pp. 186-187.
[39] Smithsonian National Museum of Natural History, 2014.
[40] See Figure 3.
[41] Bailleul-LeSuer, 2012, p. 187.
[42] See Figure 11.
[43] Gale, Gasson, Hepper, & Killen, 2000, p. 340.
[44] Harlan, 1986, p. 11.
[45] Gale, Gasson, Hepper, & Killen, 2000, p. 340.
[46] As used in the northern exterior wall of the Great Hypostyle Hall of the Temple of Amun, Karnak. Gale, Gasson, Hepper, & Killen, 2000, p. 353.; Porter, Moss, & Burney, 1972, p. 53. See Figure 17.
[47] See Figure 18.
[48] Gale, Gasson, Hepper, & Killen, 2000, p. 353. See Figure 19.
[49] Janssen, 2003, p. 25-26.

The wood then undergoes conversion to timber in preparation for use. This would be done in a workshop, with more than one person required for many of the processes. Upon entering the workshop, it would be placed vertically against a post or strapped horizontally to a trestle.[50] From there, either a pullsaw or an axe[51] would be used to cleave the desired wood from that which may be defective. As it is large and rather rough work performed in this workshop, it is unlikely that delicate work would be completed here, so it would be moved again, from the woodcutter's workshop to that of a skilled craftsman.

Like OIM E154B, it seems likely that W534 was carved from a single piece of wood.[52] Due to the gouging of the inner cavity, [53] this is likely to have been done using a chisel. Depending on the type of chisel used,[54] it may remove large sections of material or smaller, more intricate work. Given the markings on W534, it seems as though the larger chisel and mallet may have been used to form the generic shape of the bird, then smoothed and detailed[55] with a smaller chisel operated by hand only.

The piece has obvious dowel holes, [56] including the broken piece of dowel still remaining within the hollow of the head. This immediately narrows the type of join to a dowelled edge-joint, the only technique to incorporate the use of dowels.[57] This would have been used to secure pieces together as the glue was setting while allowing the carpenter to work on other pieces as opposed to simply holding this one together.[58] From this, it seems

[50] Gale, Gasson, Hepper, & Killen, 2000, p. 354.
[51] See Figure 20.
[52] Bailleul-LeSuer, 2012, p. 187.
[53] See Figure 1.
[54] Whether a more delicate hand tool or a larger blade with a handle intended to have force employed through use of a mallet. Killen, 1980, p. 17.
[55] For example, with the eyes being slightly protruding and smoothly curved.
[56] See Figure 21 and Figure 22.
[57] Gale, Gasson, Hepper, & Killen, 2000, p. 360.
[58] Killen, 1980, p. 10.

logical that the holes would have been bored with bowdrills[59], the glue applied, the dowels inserted and then the join pressed together and left to set.

The final addition to the piece would have been the paint, most likely after the mummy had been placed into the cavity and the ventral panel fitted.[60] With it in place, this would ensure that the features would line up. From the overlapping of the paint, it can be determined that it was done with one colour at a time and allowed to dry preceding the application of the next colour, whether by the same artisan or otherwise. Due to the nature of the binder, the paint would have been prepared shortly before use.[61] Due to the circular exclusion of paint from on top of the head and tail join, the headpiece and tail must have been present when the object was painted, perhaps giving more weight to the idea of them having also been of sycomore if the same paint was applied concurrently. Whether the legs would have been present depends greatly on the material used, as if they were wooden they may well have also been painted, however if they were metallic, they would not.

Due to the great variety of processes required for the creation of this object, it would no doubt have been an effort undertaken by a group of professionals. An arborist would produce the trees, a woodcutter to fell and prepare it, a carpenter or craftsman create the coffin itself and potentially a separate painter to finish the piece.[62] Overall, the elaborate skill and knowledge required to create the piece from the chosen materials indicates it must have been constructed in a workshop and thus intended for sale prior to further use.

[59] As is depicted in the 5th dynasty tomb of Ti, Saqqara. See Figure 23.
[60] Ikram, 2005, p. 11.
[61] Bryan, 2001, p. 65.
[62] The mummy would have also been prepared extensively by a group of people, someone to raise the bird and potentially somebody else to kill it, an embalmer to preserve it, and if the piece was indeed intended as a votive offering, there may also be a priest to perform a ritual to ensure it served its intended purpose.

Use/Function

The cavity within the piece indicates that it was created with the intention of storing another object, presumably W534B, a mummified bird[63], however, no accessible records note the mummy *in situ*, so, despite them having been together since at very least 1971[64], it is possible the two objects have merely become associated with one another, perhaps originating from the same assemblage. This being said, if it is the original intention that W534B were to be interred within W534, this quickly clarifies the function of W534 as a coffin. Animal mummies (and their coffins) fall within 4 categories: pets, victual offerings, sacred animals and votive offerings.[65] However, with the bird likely belonging to the falco genus, it is unlikely to have been a pet due to their nature as predatory and aggressive birds. Favoured avian pets of the Old Kingdom included hoopoe, lapwing[66] and turtle dove and of the New Kingdom, fledglings and geese. [67] Victual offerings were placed within tombs to provide food in the afterlife, some being fully prepared for consumption prior to embalming and often being interred within coffins shaped to look like meat.[68]

Sacred animals were those specific animals which showed peculiar markings which the Egyptians interpreted as a sign of divinity, the animal becoming the living embodiment of a god.[69] Looking at the mummy of the bird itself may give some indication as to whether the bird may have been sacred or votive, however, it must be realized that this may result in the application of external perception and modern interpretive biases. There tended to only be one of this type of animal installed at a temple at each time to represent a deity and customs varied greatly, bulls often being allowed to live out their natural lives while others, such as

[63] The Egypt Centre, 2005.
[64] The Egypt Centre, 2005.
[65] Ikram & Iksander, 2002, p. 2-3.
[66] See Figure 24.
[67] Houlihan, 1996, p. 112. See Figure 25.
[68] Ikram & Iksander, 2002, p. 2. See Figure 26.
[69] Ikram, 2005, p. 5.; Dodson, 2009, p. 1.

the falcon of Horus at Edfu, were dispatched and replaced each year.[70] Sacred falcons were revered most notably in Edfu, however, also at Hierakonpolis, Qus, Hebenu, Tjaru, Medinet el-Fayum, Shashotep, Kom Ombo as Haroeris and through Min-Hor-Nakht as "the strong Horus" in Akhmim.[71] Without a secure provenience, it is impossible to know whether W534 contained a falcon sacred to one of these places, though the elaborate burial[72] may suggest some higher status.

Votive offerings may consist of many different types of artefacts, ranging from small objects of everyday use to animal mummies and even to stela, the concept behind it being the dedication to a deity establishing a favourable relationship between pilgrim and god.[73] The distinguishing features between these and sacred animals are the lack of divine markings, no limitations on how many there may be at any one time and the great variety of burial qualities to appeal to pilgrims of various backgrounds.[74] For this reason, many votives will often be less elaborate than sacred animal burials. This is also one potential explanation for the forgeries mentioned previously, parts of animals providing a larger distribution and therefore perhaps a lower cost, making them more available to the masses.[75] However, while not all votives are of a high quality, there are those that are, meaning that without knowing the full provenience, it is impossible to know whether W534 was intended as a sacred animal burial or a votive offering.

[70] Dodson, 2009, p. 1.; Ray, 2000, p. 345.; Finnestad, 1997, p. 223.
[71] University College London, 2002.
[72] A wooden coffin containing a mummy requiring much more effort to create than simply a mummy without a coffin or a pot burial.
[73] Pinch & Waraksa, 2009, p. 1.
[74] Ikram, 2005, p. 9.
[75] Other explanations also include insufficient numbers of the animal required, resulting in parts being taken as full representations and corrupt animal cult industrialists making fragments look like full mummies to produce a larger quantity to sell. Ikram & Iksander, 2002, p. 3.

Transformation & Reuse

The lack of resin residue, which may be expected to hold the mummy within the cavity of the coffin[76], combined with the apparent gouging of the cavity[77], may be indicative of the original contents having been forcibly removed in order for a new internment. This may also be supported by the lack of ventral panel and the broken tail piece: if it is true that it was damaged in antiquity, this may be evidence of rough handling.

With the pilgrimage industry generating an economy and providing for priests, embalmers and craftsmen associated with the animal cults[78], there have been examples of ancient 'forgeries' consisting of mummified bundles of reeds, feathers and bones posing as full votive mummies to maximize profits.[79] With evidence of underhand practices such as this, it seems plausible that the same people may exhume previously buried offerings to be sold again and enhance profits further.

Deposition

With the coffin having served as either a sacred animal or a votive offering, it would have been intentionally deposited either as a divine burial or dedication to a god.[80] Had it been a sacred animal, a lengthy mourning period would be observed while preparations were undertaken for burial, the coffin being interred within a special cemetery close to the temple at which the animal had been reared.[81] A votive offering would likely not have had a mourning period due to the large quantity of them and would be interred within a mass burial, such as the catacombs of Saqqara or animal cemetery of Abydos. Without a secure provenience, it is impossible to determine whether or not the deposition site remained intact,

[76] Ikram & Dodson, 1998, p. 116.
[77] See Figure 1.
[78] Scalf, 2012, p. 39.
[79] Such as OIM E9237. Bailleul-LeSuer, 2012c, p. 199; Ikram & Iksander, 2002, p. 3.
[80] Osborne, 2004, p. 5.
[81] Ikram, 2005, p. 5-6.

however, the likely long-lasting use of such a cemetery and potential for unscrupulous practices may suggest disturbances.

Rediscovery

In order to trace the rediscovery of an artefact, the most efficient way is to verify the most recent information and attempt to work backwards through the provenance. This may be through additions to the object itself, such as labels, or accompanying records and in most cases will expand through more than one institute, such as the current museum, a prior owner or collector, an auction or an excavation. For this reason, it is crucial to work backwards in order to incorporate every stage the artefact passes through in order to reach its modern residence.

The coffin came to Swansea University in 1971, being transferred on permanent loan from the Trustees of the Wellcome Collection.[82] With the Trustees being established as a clause of Wellcome's will in 1936[83], the object must have come into his possession prior to this date.[84] The Wellcome Collection had accessioned the piece 211151, however, on arrival in Swansea it was reaccessioned W534. Due to the apparent auction number of "Lot 818" on the side of the object[85], it can be ascertained that Wellcome acquired the piece in auction.[86] The inclusion of "14623" is also an indication of the piece being part of another collection, however, with it being present on the auction sticker, it is uncertain whether this may have been the accession number assigned to the piece prior to being assimilated into Wellcome's

[82] The Egypt Centre, 2005.
[83] Bailey, 2009.
[84] Further information to this is available in Rowbottom & Keighely, however, this resource was not accessible at the time of writing.
[85] See Figure 27.
[86] Searching all accessible Sotheby catalogues, both physically and digitally, yielded no results, therefore, it is almost certain to have been a different auction house. Other possibilities that Wellcome (or his agents) were known to frequent include the J. C. Stevens Auction Rooms, Glendining & Co., Christie's, Harrods Ltd and Allsop & Co. The Wellcome Collection, 1921; The Wellcome Collection, 1936; The Wellcome Collection, 1937; The Wellcome Collection, 1939; Larson, 2009, p. 79.

collection, or whether it may have been another allocation between the Wellcome number of 211151 and the Egypt Centre's W534. Without access to Rowbottom & Keighely, this is currently as far as the provenance can be determined securely.

Parallels come into play yet again here, their provenances giving indications of what may have been the case of W534. This is particularly true in the case of OIM E154B and A423000-0.[87] OIM E154B is recorded as having been purchased by J. H. Breasted in 1894-5 in Akhmim[88] and sent to the Haskell Oriental Museum, predecessor to the Oriental Institute.[89] A423000-0 was found by Maspero in Akhmim, purchased by the Metropolitan Museum of Art[90] in 1886 and further sold to the Smithsonian on 19th January 1959.[91] Having both been rediscovered in Akhmim, this may also be the case for W534, especially when considering the relationship between Wellcome and Maspero.[92] This is a good indication that W534 would have been part of a planned excavation, Maspero having shown a great interest in Akhmim from as early as March 1883.[93]

Both the coffin and the mummy of W534 could be subject to further scientific analyses which may potentially confirm or contradict theories made regarding the piece. The wood itself may be subject to microscopic analysis which may verify the earlier proposal of sycomore as the material, however, a sample would need to be taken, thus damaging the artefact, and an expert in cellular botany brought in. Even if it is confirmed, knowing that it is definitely of sycomore provides little information, the sycomore being cultivated throughout

[87] While other potential objects have been identified, these two, both from Akhmim, provide some of the closest parallels, many other wooden coffins investigated either not having a detailed provenance or being rectangular or trapezoidal rather than zoomorphic.
[88] Bailleul-LeSuer, 2012, p. 186.
[89] Bailleul-LeSuer, 2012, p. 183.
[90] The MMA accessioned the piece 223500 and featured it in the 1898 Catalogue of Egyptian Antiquities in Halls 3 and 4. Gillett, 1898, p. 40.; Smithsonian National Museum of Natural History, 2014.
[91] Smithsonian National Museum of Natural History, 2014.
[92] Larson, 2009, p. 64.
[93] O'Connell, 2008, p. 3.

Egypt[94] and species being indeterminable even at microscopic level[95], meaning that sycomore from Egypt may look no different than that in any other distribution, accessible to the creators of this piece or otherwise. The binder of the paint and adhesive may be ascertained from liquid or gas chromotography or mass spectrometry to determine the likeliest possibility based on protein collagens or polysaccharides[96], though this also requires specialist equipment and adds more to a general understanding of Egyptian craft as opposed to specific information that provides a greater comphrehension of W534. The mummy may undergo deoxyribonucleic acid extraction to determine the species of bird and trace isotopes within the bones may even reveal diet.[97] While this information could be useful, especially when considering that the diet of the bird may reveal the treatment of it and thus indicate perceptions of it in life, deoxyribonucleic acid is prone to diagenesis with age[98], which may prevent a reliable sample being taken for mitochondrial analysis.

Reinterpretation and Current Reuse

Being displayed within a case for animals in Ancient Egypt, the display may not properly express the divine connotations that would have been within the Egyptian perceptions of the piece. As either a sacred animal or a votive offering, the original owner would likely be distraught as the removal of the object from the cemetery could sever the connection between the donor and the deity. This being said, this severance would have occurred from the initial excavation and so display does not actually change whether or not the detachment occurs. However, with the coffin having been intended to remain within a catacomb, display in the open would likely have been seen as a sacrilegious act.[99] With it also being the first case seen

[94] Harlan, 1986, p. 11.
[95] Alden, 1998, p. 7.
[96] Newman & Serpico, 2000, p. 475.
[97] White & Folkens, 2005, p. 413.
[98] White & Folkens, 2005, p. 347.
[99] Edwards, 2010, p. 408.

upon entering the House of Death gallery, it may aggrieve some people as ideologically sensitive material, particularly in the case of young children seeing dead beings.

Contradictory to the negative aspects of display, the current reuse can be highly beneficial to both scholars and members of the public. A great deal of information can be gained from the study of objects such as W534 and having displays such as this generates a great deal of interest in understanding cultural heritage, as well as supporting modern education.[100] The Museums Association acts as a national board to maintain set standards within all British Museums, including a full Code of Ethics, to which the Egypt Centre display does abide.[101] Further to this, W534B, the mummified bird associated with W534, has been removed from the cavity, it no longer containing remains. Perpetual debate has long surrounded the display of human remains[102], it is unclear how far these same principles should apply to non-human remains. Even without W534B being displayed, the connection to the coffin is clear, and other remains, such as W530 and W985, are.

For these reasons, it may be beneficial to change the location of the cases within the gallery, perhaps moving the remains further into the gallery and potentially putting up notices to warn people prior to entering the gallery. An additional label may highlight the ancient perspective of the piece as well, the singular thematic nature of the case currently being slightly misleading.

Conclusion

Thorough research has transformed the once relatively unknown bird coffin into a likely sycomore votive offering or sacred animal burial. Small features indicate techniques for

[100] Such as the inclusion of Egyptian history on the National Curriculum, with museums often providing a more visual experience of the past which may be more appealing to children. Department for Education, 2013, p. 5.
[101] The Museums Association, 2008.
[102] Department for Culture, Media and Sport, 2005, p. 20.; Ministry of Justice, 2004; Alberti, Bienkowski, Chapman, & Drew, 2009.

production, the use and reuse of the object and ancient and modern transformations. Further scientific analyses may confirm the theories presented, though a great deal has been learnt simply from examining the piece.

Figures

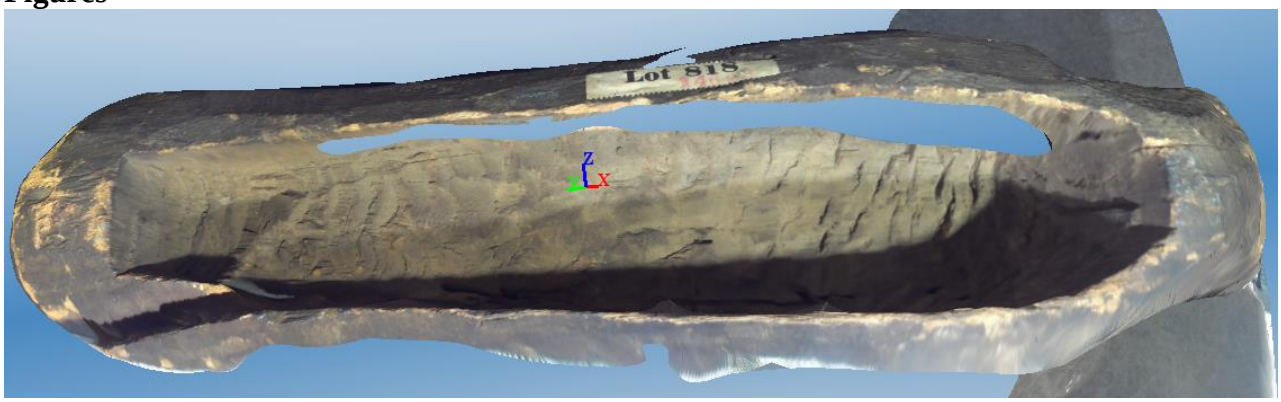

Figure 1 – A 3D rendering of W534 using 123D Catch – Photo by Author, 2014.

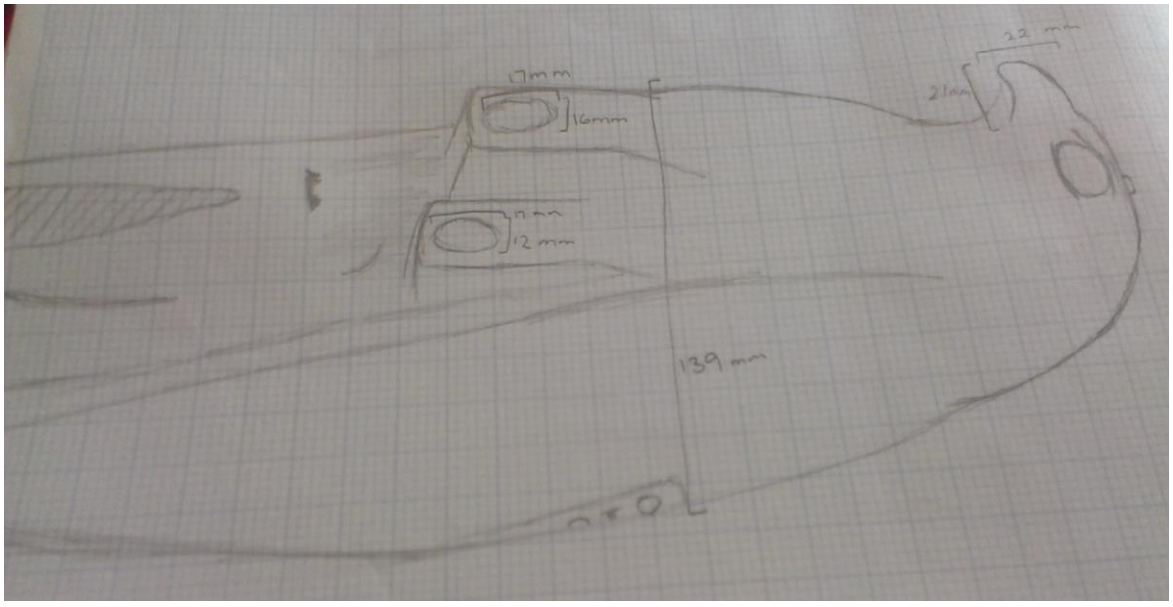

Figure 2 – Illustration by Author, 2014.

Figure 3 - Underside of W534 showing holes where pegs should be inserted for the legs - Photo by Author, 2014.

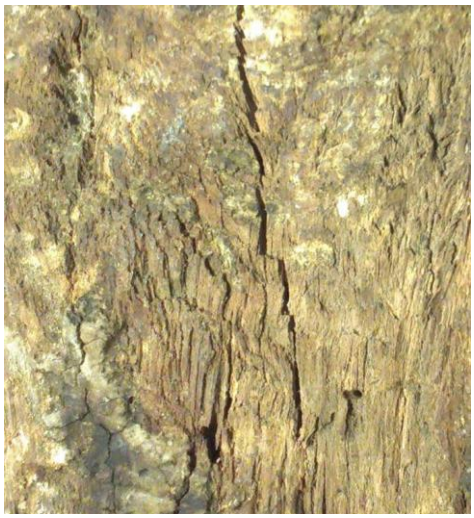

Figure 4 – Close up of the wood and colouration of W534 – Photo by Author, 2014.

Figure 5 – The underside of W534 showing the red paint – Photo by Author, 2014.

Figure 6 – The head of W534, showing the black paint – Photo by Author, 2014.

Figure 7 – The top of the head of W534 – Photo by Author, 2014.

Figure 8 – OIM E154B showing many similar features to W534, including holes in the head to allow for connection of a headpiece – Photo by Anna R. Ressman, The Oriental Institute of the University of Chicago

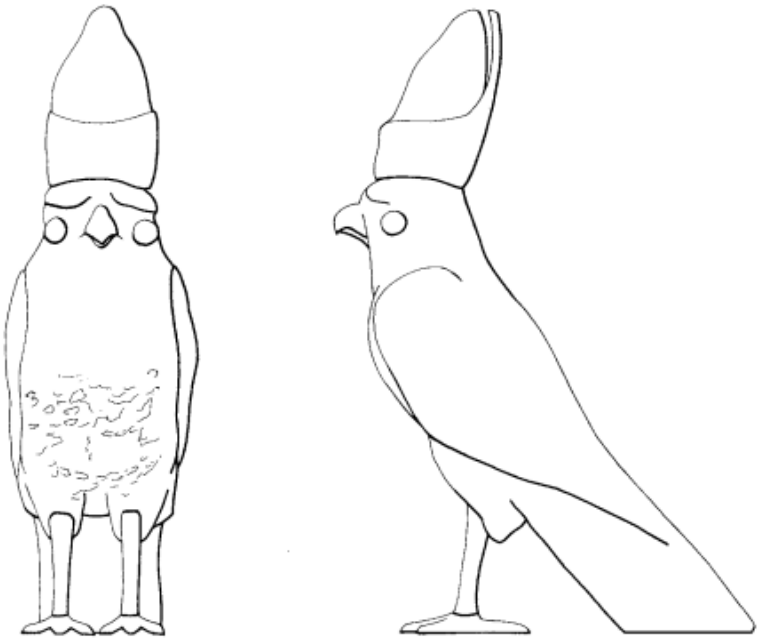

Figure 9 – A drawing of a possible reconstruction of OIM E154B – By Angela Altenhofen in Bailleul LeSuer, 2012, p. 186.

Figure 10 – A423000, showing a similar lack of paint on the head – Smithsonian National Museum of Natural History, 2014.

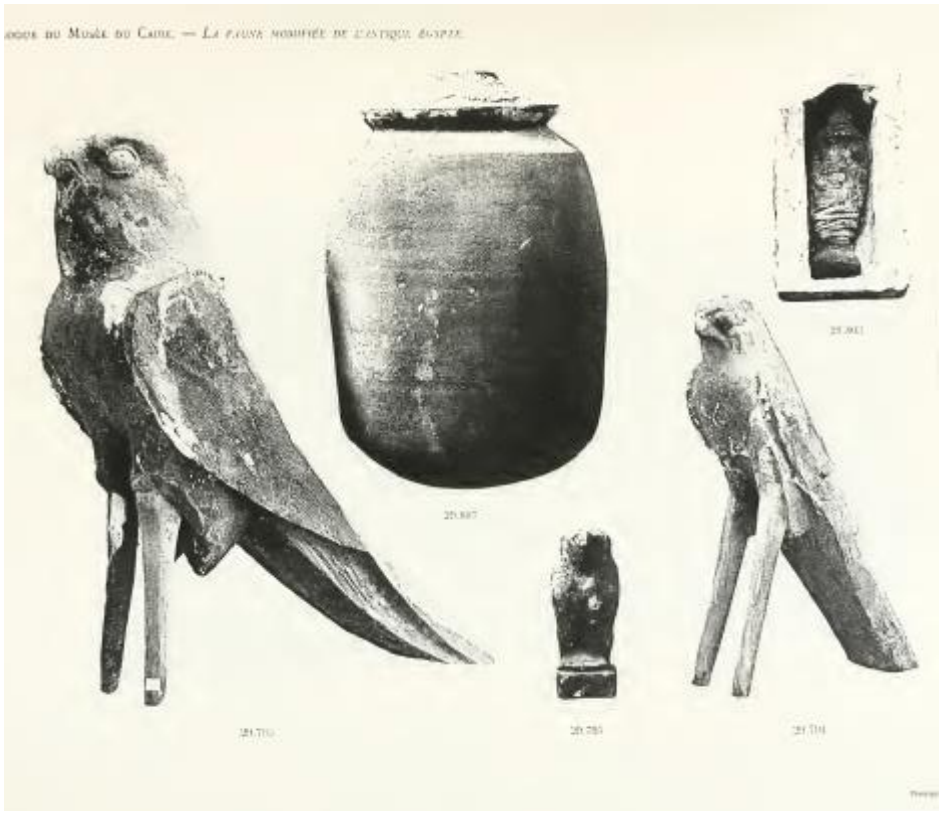

Figure 11 – Photographs of Cairo Museum 29793 and 29794, Gaillard & Daressy, 1905, Place LX.

Figure 12 – The tail piece of W534, featuring a large fracture – Photo by Author, 2014.

Figure 13 – Close up of the head and beak of W534 – Photo by Author, 2014.

Figure 14 – A potential positioning of W534, had it retained its legs – Photo by Author, 2014.

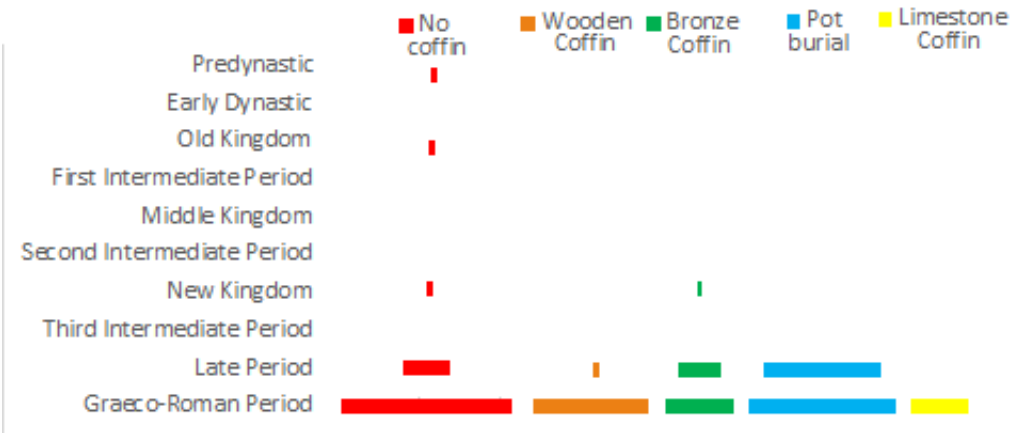

Figure 15 – A frequency seriation graph illustrating the use of particular coffin types in raptor burials by period for dating purposes – Graph by Author, 2014.

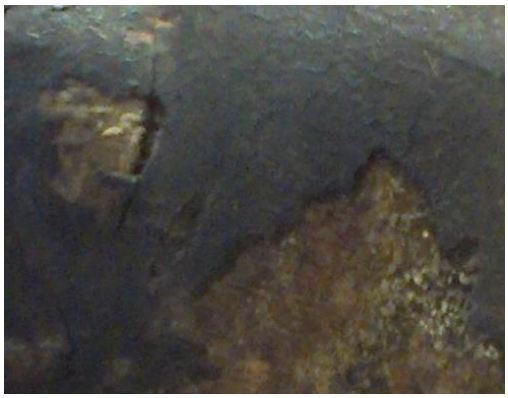

Figure 16 – A close-up of the head, showing the thickness of the layering of the paint – Photo by Author, 2014.

Figure 17 – Felling of the trees in the Lebanon tribute scene on the northern exterior wall of the great hypostyle hall of the Temple of Amun, Karnak – Photo by The Karnak Great Hypostyle Hall Project, n.d.

Figure 18 – A sketch of a relief at Deir-el Bahri depicting logs being moved with the use of ropes, Naville, 1898, Plate LXX.

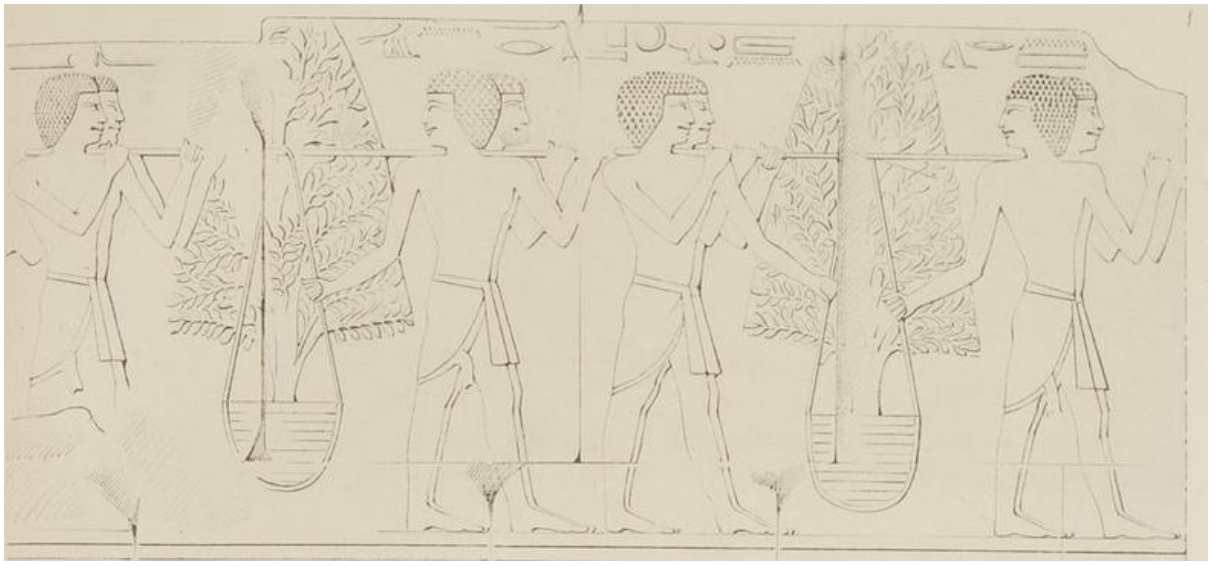

Figure 19 – A sketch of a relief at Deir-el Bahri depicting trees being moved in baskets, Naville, 1898, Plate LXXIV.

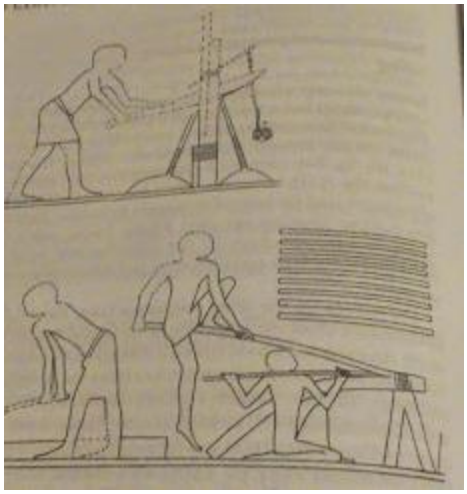

Figure 20 – Scene from the 6th Dynasty Tomb of Iteti – Illustration in Gale, Gasson, Hepper & Killen, 2000, p. 354.

Figure 21 – Top of the head showing a broken dowel – Photo by Author, 2014.

Figure 22 – Dowel hole in the tail piece – Photo by Author, 2014.

Figure 23 – Relief depicting the use of a bowdrill in the 5th dynasty tomb of Ti – Photo by "Kairoinfo4u", 2010.

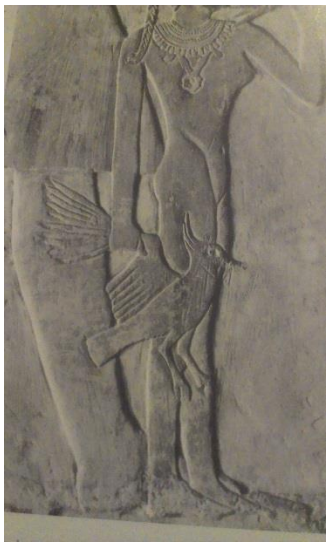

Figure 24 – A child holding a pet lapwing by its wings in the 5th dynasty tomb of Nefer at Saqqara – Photo by Houlihan, 1996, p. 110.

Figure 25 – A painting of a New Kingdom woman holding a gosling or duckling close to her breast from the 18th dynasty tomb chapel of Nakht – Photo by Houlihan, 1996, p. 111.

Figure 26 – A victual mummy from the tomb of Yuya and Tuya (KV46) – Photo by Anna-Marie Kellen in Ikram, 2012, p. 41.

Figure 27 – Sticker on the side of W534 featuring "Lot 818" and "14623" – Photo by Author, 2014.

Appendices

Appendix 1 – Burials and remains considered within the dating of W534[103]

Oriental Institute of Chicago OIM E10604 OIM E150 OIM E154B (Wooden, zoomorphic) OIM E146
Smithsonian National Museum of Natural History A423000-0 (Wooden, zoomorphic) A435221-0 A454235-0
Egyptian Museum, Cairo CG 29793 (Wooden, zoomorphic) CG 29794 (Wooden, zoomorphic) CG 29796 (w) CG 29798 (w) CG 29800 (w) CG 29801 (w) CG 29802 JE 91451 CG 29681 CG 29682 CG 29685 CG 29689 CG 29879 CG 29881 CG 29882 CG 29883 JE 29902 JE 30764
National Museum of Krakow MNK XI-486 (Wooden, zoomorphic)
Musée de Confluences, Lyon

[103] Figures acquired from Peet & Loat, 1914; Ikram, 2010 p. 1-2.; Ikram, 2007, p. 422-423.; The Global Egyptian Museum, n.d.; The Global Egyptian Museum, n.d.; Ikram & Iksander, 2002; Davies & Smith, 2005; Bailleul-LeSuer, 2012, p. 186-188. Smithsonian National Museum of Natural History, 2014; Jett, Sturman, & Weisser, 1985, p. 112-113.; Linseele, Neer, & Friedman, 2009, p. 112.

90000834 (Wooden, zoomorphic)
Musée Auguste Grasset de Varzy VA5 (Wooden, zoomorphic)
Emory University: Michael C. Carlos Museum 1958.063
Koninklijke Musea voor Kunst en Geschiedenis - Musées royaux d'Art et d'Histoire E.8444
National Museums and Galleries on Merseyside 61.202.187 1973.4.147 1976.159.268 42.18.1A 42.18.4A 52.55.46 52.55.47 56.21.577
Museo Arqueológico Nacional 15101
Roemer-Pelizaeus Museum 6486
Museu Nacional de Arqueologia E 126
The Walters Art Gallery 54.547 54.2115 54.2116 54.2120
The British Museum EA36154 EA15980 EA79361 EA27388
The Metropolitan Museum of Art 90.6.107
The Virtual Egyptian Museum: The Senusret Collection MET.XL.00842.S
Durham University EG723 DUROM.1999.51
Brooklyn Museum 37.416Ea-b 37.1391Ea-b 05.394 13.1092
The Fitzwilliam Museum E.7.1971 E.80.1975
The Petrie Museum UC55001
Saqqara Falcon Catacomb FCO1 H5-1728 [3678] (Wooden, rectangular) FCO144** H5-2206 [4276] FCO145** H5-2207 [4277] FCO146** H5-2208 [4278] FCO147** H5-2209 [4311] FCO148** H5-2210 [4312] FCO149** H5-2211 [4313]

FCO150** H5-2212 [4314]
FCO151** H5-2213 [4315]
FCO152** H5-2214 [4316]
FCO153** H5-2215 [4317]
FCO186 H5-2279 [4470]
FCO187 H5-2280 [4471]
FCO240 H5-2361 [4566] (Wooden, rectangular)
FCO241 H5-2362 [4567] (Wooden, rectangular)
FCO242 H5-2363 [4568] (Wooden, rectangular)
FCO245 H5-2368 [4573]
FCO246 H5-2369 [4574]
FCO247 H5-2370 [4575]
FCO248 H5-2371 [4576]
FCO249 H5-2372 [4577]
FCO250 H5-2373 [4578]
FCO251 H5-2374 [4579]
FCO252 H5-2375 [4580]
FCO253 H5-2376 [4581]
FCO254 H5-2377 [4582]
FCO255 H5-2378 [4583]
FCO256 H5-2379 [4584] (Wooden, rectangular)
FCO299** H5-2424 [4629] (Wooden, rectangular)
FCO300 H5-2425 [4630] (Wooden, rectangular)
FCO301 H5-2426 [4631] (Wooden, rectangular)
FCO302 H5-2427 [4632] (Wooden, trapezoidal)
FCO303** H5-2428 [4633] (Wooden, trapezoidal)
FCO304 H5-2429 [4634] (Wooden, trapezoidal)
FCO305** H5-2430 [4635] (Wooden, trapezoidal)
FCO306 H5-2431 [4636] (Wooden, trapezoidal)
FCO309** H5-2435 [4640]
FCO314 H5-2440 [4645]
FCO315 H5-2441 [4646]
FCO334 H5-2460 [4701] (Wooden, trapezoidal)
FCO403 H5-2563 [4832]
FCO404 H5-2564 [4833]
FCO405 H5-2565 [4834]
FCO406 H5-2566 [4835]
FCO407 H5-2567 [4836]
FCO408 H5-2568 [4837]
FCO409 H5-2569 [4847]
FCO410 H5-2577 [4854]
FCO411 H5-2578 [4855]
FCO412 H5-2579 [4856]
FCO413 H5-2580 [4857]
FCO414 H5-2581 [4858]
FCO415 H5-2581 [4859]
FCO416 H5-2582 [4860]
FCO417 H5-2583 [4861]
FCO418 H5-2584 [4862]
FCO419 H5-2585 [4863]
FCO420 H5-2586 [4864]
FCO421 H5-2587 [4865]
FCO422 H5-2591 [4868] (Wooden, rectangular)
FCO426** H5-2687 [4967]
FCO429** H5-2690 [4970]
FCO470** H5-2738 [5018]
FCO477 H5-2753 [5035]

FCO489** H5-2767 [5118] FCO500 H5-2778 [5130] FCO502 H5-2782 [5145] FCO503 H5-2783 [5146] FCO504 H5-2784 [5147] FCO505 H5-2785 [5148] FCO506 H5-2786 [5149] FCO510** H5-2799 [5156] (Wooden, zoomorphic) FCO533 H5-2826 [5199] FCO536 H5-2834 [5207] FCO538 H5-2836 [5209] FCO541 H5-2839 [5212] (Wooden, rectangular) FCO542 H5-2840 [5213] FCO545 H5-2959 [5234] FCO546 H5-2860 [5235] FCO547 H5-2861 [5236]
Amheida Temple of Thoth A08/4.1/120/13256 (29 raptors interred within this single ceramic coffin)
Kunsthistorisches Museum KhM 4239
Penn Museum 72-19-1 97-121-29
Freud Museum 3285 3484
Abydos Ibis Cemetery 1005 (2 raptors interred within a single pot) 1007 (5 raptors interred within a single pot) 1011 1020 1021 (2 raptors interred within a single pot) 1023 1024 1049 (3 raptors interred within a single pot) 1057 (2 raptors interred within a single pot) 1061 1064 1077 (2 raptors interred within a single pot) 1079 (2 raptors interred within a single pot)
Hierakonpolis HK29A (unnumbered) found in 1980 excavation of the wall trench, potentially intrusive (unnumbered) found in 1980 excavation of the wall trench, potentially intrusive

Appendix 2 – The Smithsonian object file for A423000

A423000

National Museum of Natural History
Department of Anthropology

Tuesday, September 30, 2014

Personal use only-- Some data may be unverified

Catalog number	A423000-0
Number of parts	1
Storage location	X4-001-002-05 [on exhibit]
Index term	Animal Mummy / Coffin
Object name	Hawk-Shaped Wooden Coffin, With Hawk Mummy
Culture	Ancient Egyptian
Locality	Upper Egypt; Akhmim
Accession number	223500
Accession date	19 Jan 1959
Source	[Purchased From] The Metropolitan Museum of Art
Remarks	From card: "Found at Akhmin by Maspero [Egyptologist and Director of the Cairo Museum Gaston Maspero], purchased from Egyptian Government 1886; Wood. Bibl.: MMA Egyptian Catalogue, 1898, No. 214. Painted red, black, and gold. 3-12-1987 lent to Memphis Pink Palace Museum; loan returned Dec 9 1987."
Remarks	From NMNH Exhibit Hall "Eternal Life in Ancient Egypt" label for this artifact, 2011: Mummified falcon in coffin, 332-30 B.C. This wood coffin originally had legs and a sun disc emerging from the head to identify it with a sun god. A falcon mummy is still tucked in a recess in the back.

Bibliography

Alberti, S., Bienkowski, P., Chapman, M. J., & Drew, R. (2009). Should we Display the Dead? *Museum and Society, 7*(3), 133-149.

Alden, H. A. (1998). *Scientific Limits of Microscopic Wood Analysis of Objects d'Art.* Arlington: 26th American Institute of Conservation Annual Meeting.

Bailey, P. (2009, January 20). *Henry Wellcome's legacy: The Wellcome Trust*. Retrieved December 4, 2014, from The Wellcome Trust: http://www.wellcome.ac.uk/About-us/History/WTX052938.htm

Bailleul-LeSuer, R. (2012). Birds in Death and the Afterlife. In R. Bailleul-LeSuer, *Between Heaven and Earth: Birds in Ancient Egypt* (pp. 201-213). Chicago: The Oriental Institute of the University of Chicago.

Bailleul-LeSuer, R. (2012). Birds in the Religious Life of Ancient Egyptians: Falcon Cults. In R. Bailleul-LeSuer, *Between Heaven and Earth: Birds in Ancient Egypt* (pp. 178-188). Chicago: The Oriental Institute of the University of Chicago.

Bailleul-LeSuer, R. (2012). Catalog: Birds in the Religious Life of the Ancient Egyptians: Ibis Cults. In R. Bailleul-LeSuer (Ed.), *Between Heaven and Earth: Birds in Ancient Egypt* (pp. 189-200). Chicago: The Oriental Institute of the University of Chicago.

Barbash, Y. (2013). How the Ancient Egyptians Viewed the Animal World. In E. Bleiberg, Y. Barbash, & L. Bruno, *Soulful Creatures: Animal Mummies in Ancient Egypt* (pp. 19-62). Brooklyn, New York: Brooklyn Museum in association with D Giles Ltd.

Bleiberg, E. (2013). Animal Mummies: The Souls of the Gods. In E. Bleiberg, Y. Barbash, & L. Bruno, *Soulful Creatures: Animal Mummies in Ancient Egypt* (pp. 63-106). Brooklyn, New York: Brooklyn Museum in association with D Giles Ltd.

Brewer, D. (2012). *The Archaeology of Ancient Egypt.* Cambridge: Cambridge University Press.

Broekman, G. P. (2009). Falcon-headed Coffins and Cartonnages. *Journal of Egyptian Archaeology*, 67-81.

Bruno, L. (2013). The Scientific Examination of Animal Mummies. In E. Bleiberg, Y. Barbash, & L. Bruno, *Soulful Creatures: Animal Mummies in Ancient Egypt* (pp. 107-138). Brooklyn, New York: Brooklyn Museum in association with D Giles Ltd.

Bryan, B. (2001). Painting Techniques and Artisan Organization in the Tomb of Suemniwer, Theban Tomb 92. In W. V. Davies (Ed.), *Colour and Painting in Ancient Egypt* (pp. 63-72). London: The British Museum Press.

Davies, S., & Smith, H. S. (2005). *The Sacred Animal Necropolis at North Saqqara. The Falcon Complex and Catacomb : The Archaeological Report.* London: Egypt Exploration Society.

Davies, W. V. (1995). Ancient Egyptian Timber Imports: An Analysis of Wooden Coffins in the British Museum. In W. V. Davies, & L. Schofield, *Egypt, the Aegean and the Levant: Interconnections in the Second Millenium BC* (pp. 146-156). London: British Museum Press.

Department for Culture, Media and Sport. (2005). *Guidance for the Care of Human Remains in Museums.* London: Department for Culture, Media and Sport. Retrieved 12 8, 2014, from https://www.britishmuseum.org/pdf/DCMS%20Guide.pdf

Department for Education. (2013). *History Programmes of Study: Key Stages 1 and 2: National Curriculum in England.* London: Department for Education.

Dodson, A. (2009, July 16). *Rituals Related to Animal Cults*. (J. Dieleman, & W. Wendrich, Editors) Retrieved October 7, 2014, from UCLA Encyclopedia of Egyptology: http://escholarship.org/uc/item/6wk541n0

Edwards, A. (2010). Care of Sacred and Culturally Sensitive Objects. In *Museum Registration Methods* (pp. 408-425). Washington DC: The American Association of Museums Press.

Ellis, L. (2000). Clays and Ceramics, Characterization. In L. Ellis (Ed.), *Archaeological Method and Theory: An Encyclopedia* (pp. 106-110). New York: Garland Publishing, Inc. .

Emery, W. B. (1971). Preliminary Report on the Excavations at North Saqqâra, 1969-70. *The Journal of Egyptian Archaeology, 57*, 3-13.

Finnestad, R. B. (1997). Temples of the Ptolemaic and Roman Times: Ancient Traditions in New Contexts. In B. E. Shafer (Ed.), *Temples of Ancient Egypt* (pp. 185-238). New York: I. B. Tauris & Co. Ltd. .

Gaillard, C., & Daressy, G. (1905). *Catalogue Général des Antiquités Égyptiennes du Musée du Caire: La faune momifiée de l'ancienne Égypte.* Lyon: Le Caire: Imprimerie de l'Institut français d'archéologie orientale.

Gale, R., Gasson, P., Hepper, N., & Killen, G. (2000). Wood. In P. Nicholson, & I. Shaw (Eds.), *Ancient Egyptian Materials and Technology* (pp. 334-371). Cambridge: Cambridge University Press.

Germond, P. (2001). *An Egyptian bestiary animals in life and religion in the land of the Pharaohs.* London: Thames & Hudson.

Gillett, C. R. (1898). *Catalogue of the Egyptian Antiquities in Halls 3 and 4.* New York: Metropolitan Museum of Art.

Harlan, J. R. (1986). Lettuce and the Sycomore: Sex and Romance in Ancient Egypt. *Economic Botany, 40*(1), 4-15.

Helbig, A. J., Seibold, I., Bednarek, W., Gauncher, P., Ristow, D., Scharlau, W., . . . Wink, M. (1994). Phylogenetic Relationships among Falcon Species (Genus Falco) According to DNA Sequence Variation of the Cytochrome b Gene. In R. D. Chancellor, & B. U. Meyburg (Ed.), *Raptor Conservation Today: Proceedings of the IV World Conference on Birds of Prey and Owls* (pp. 593-99). Berlin; London; Paris: World Working Group on Birds of Prey and Owls.

Hepper, N. (2009). *Pharaoh's Flowers : The Botanical Treasures of Tutankhamun.* Chicago: KWS Publishers.

Houlihan, P. F. (1996). *The Animal World of the Pharaohs.* London: Thames and Hudson Ltd.

Houlihan, P. F., & Goodman, S. M. (1986). *The Birds of Ancient Egypt.* Warminster: Aris & Phillips.

Ikram, S. (2005). Divine Creatures: Animal Mummies. In S. Ikram (Ed.), *Divine Creatures: Animal Mummies in Ancient Egypt* (pp. 1-15). Cairo: The American University in Cairo Press.

Ikram, S. (2007). Animals in the Ritual Landscape at Abydos: A Synopsis. In Z. A. Hawass, & J. Richards (Eds.), *The Archaeology and Art of Ancient Egypt: Essays in Honor of David B. O'Connor* (Vol. 2, pp. 417-432). Cairo: Supreme Council of Antiquities.

Ikram, S. (2010). *Excavations at Amheida 2010: Brief Preliminary Report on the Bird Coffins and Their Contents from Amheida.* New York: New York University.

Ikram, S. (2012). An Eternal Aviary: Bird Mummies from Ancient Egypt. In R. Bailleul-LeSuer, *Between Heaven and Earth: Birds in Ancient Egypt* (pp. 41-48). Chicago: The Oriental Institute of the University of Chicago.

Ikram, S., & Dodson, A. (1998). *The Mummy in Ancient Egypt: Equipping the Dead for Eternity.* London: Thames & Hudson Ltd.

Ikram, S., & Iksander, N. (2002). *Catalogue Général of Egyptian Antiquities in the Cairo Museum: Nos. 24048-24056; 29504-29903 (selected); 51084-51101; 61089: Non-Human Mummies.* Cairo: The Supreme Council of Antiquities Press.

Janssen, J. (2003). The Woodcutters. In J. Janssen, E. Frood, & M. Goecke-Bauer, *Woodcutters, Potters and Doorkeepers: Service Personnel of the Deir el-Medina Workmen* (pp. 1-28). Leiden: Nederlands Instituut Vor Het Nabijue Oosten.

Jett, P., Sturman, S., & Weisser, T. D. (1985). A Study of the Egyptian Bronze Falcon Figures in the Walters Art Gallery. *Studies in Conservation, 30*(3), 12-18.

Kairoinfo4u. (2010, November 20). *Mastaba of Ti -020.* Retrieved November 2, 2014, from Flickr: https://www.flickr.com/photos/manna4u/5248653899/in/set-72157625568944914/

Kessler, D., & el-Din, A. e. (2005). Tuna al-Gebel: Millions of Ibises and Other Animals. In S. Ikram, *Divine Creatures: Animal Mummies in Ancient Egypt* (pp. 120-163). Cairo: The American University of Cairo Press.

Killen, G. (1980). *Ancient Egyptian Furniture: Volume 1: 4000-1300BC.* Warminster: Aris & Phillips Ltd.

Larson, F. (2009). *An Infinity of Things: How Sir Henry Wellcome Collected the World.* Oxford: Oxford University Press.

Lee, L., & Quirke, S. (2000). Painting Materials. In P. Nicholson, & I. Shaw (Eds.), *Ancient Egyptian Materials and Technology* (pp. 104-120). Cambridge: Cambridge University Press.

Linseele, V., Neer, W. V., & Friedman, R. (2009). Special Animals from a Special Place? The Fauna from HK29A at Predynastic Hierakonpolis. *Journal of the American Research Center in Egypt, 45*, 105-136.

Matoian, V., & Loffet, H. (1997). *Les antiquites egyptiennes et assyriennes du Musee Auguste Grasset de Varzy.* Nevers: Musees de la Nievre .

Ministry of Justice. (2004). Human Tissue Act 2004. London: Ministry of Justice.

Naville, E. (1898). *The Temple of Deir el Bahara III.* London: Egypt Exploration Fund.

Newman, R., & Halpine, S. (2001). The Binding Media of Ancient Egyptian Painting. In W. V. Davies (Ed.), *Colour and Painting in Ancient Egypt* (pp. 22-32). London: The British Museum Press.

Newman, R., & Serpico, M. (2000). Adhesives and Binders. In P. Nicholson, & I. Shaw (Eds.), *Ancient Egyptian Materials and Technology* (pp. 475-494). Cambridge: Cambridge University Press.

Nicholson, P. (1994). Preliminary Report on Work at the Sacred Animal Necropolis, North Saqqara, 1992. *The Journal of Egyptian Archaeology, 80*, 1-10.

Nicholson, P. T. (2005). The Sacred Animal Necropolis at North Saqqara: The Cults and Their Catacombs. In S. Ikram, *Divine Creatures: Animal Mummies in Ancient Egypt* (pp. 44-71). Cairo: The American University of Cairo Press.

Oakley, K. P. (1932). Wood Used by the Ancient Egyptians. *Analyst*(57), 158-159.

O'Connell, E. R. (2008). *Representation and Self-Presentation in Late Antique Egypt: 'Coptic' Textiles in the British Museum.* Lincoln: University of Nebraska.

Osborne, R. (2004). Hoards, Votives, Offerings: The Archaeology of the Dedicated Object. *World Archaeology, 36*(1), 1-10.

Peet, T. E., & Loat, W. (1914). *The Cemeteries of Abydos* (Vol. 3). London: Egypt Exploration Fund.

Pinch, G., & Waraksa, E. A. (2009). Votive Practices. In J. Dieleman, & W. Wendrich, *UCLA Encyclopedia of Egyptology*. Los Angeles: University of California. Retrieved October 21, 2014, from http://escholarship.org/uc/item/7kp4n7rk

Porter, B., Moss, R., & Burney, E. (1972). *Topographical Bibliography of Ancient Egyptian Hieroglyphic Texts, Reliefs and Paintings II: Theban Temples* (2nd ed.). Oxford: Clarendon Press on behalf of the Griffith Institute.

Ray, J. D. (2000). Cults: Animal Cults. In D. B. Redford (Ed.), *The Oxford Encyclopedia of Ancient Egypt* (pp. 345-348). New York: Oxford University Press.

Renfrew, C., & Bahn, P. (1991). *Archaeology: Theories, Methods and Practice* (6th ed.). London: Thames & Hudson Ltd.

Rowbottom, & Keighely. (n.d.). *210001-212630 - WA/HMM/CM/Not/199* (Vol. 1). London: The Wellcome Collection. Retrieved from http://search.wellcomelibrary.org/iii/encore/record/C__Rb1834037__SWALw%3D%3DHMMLw%3D%3DCMLw%3D%3DNotLw%3D%3D199__Orightresult__U__X3?lang=eng&suite=cobalt

Scalf, F. (2012). The Role of Birds Within the Religious Landscape of Ancient Egypt. In R. Bailleul-LeSuer (Ed.), *Between Heaven and Earth: Birds in Ancient Egypt* (pp. 33-40). Chicago: The Oriental Institute of the University of Chicago.

Smithsonian National Museum of Natural History. (2014, July 7). *Archaeology: Hawk-Shaped Wooden Coffin, With Hawk Mummy*. Retrieved from Smithsonian National Museum of Natural History: http://collections.mnh.si.edu/search/anth/?bc=A423000

Sustaita, D., & Hertel, F. (2010). In vivo bite and grip forces, morphology and prey-killing behavior of North American accipiters (Accipitridae) and falcons (Falconidae). *The Journal of Experimental Biology*, 2617-2628.

The Egypt Centre. (2005). *Mummified remains, Non-human, Bird*. Retrieved November 25, 2014, from The Egypt Centre: http://www.egyptcentre.org.uk/index.asp?page=item&mwsquery={Identity%20number}={W534b}

The Global Egyptian Museum. (n.d.). *Organic Remains: Bird: Bird Mummy: Falcon Mummy*. Retrieved November 28, 2014, from The Global Egyptian Museum: http://www.globalegyptianmuseum.org/advanced_result.aspx?category=02%2F0266%2F1&category=02%2F0267%2F2&category=02%2F0270%2F3&category=02%2F0271%2F4&material=&dating=&site=&god=&king=&letter=&person=&location=&inventory=&searchbutton=Search

The Global Egyptian Museum. (n.d.). *Tomb Equipment: Coffin/Sarcophagus/Cartonnage: Coffin/Sarcophagus of Animals: Coffin/Sarcophagus of Bird*. Retrieved November 28, 2014, from The Global Egyptian Museum: http://www.globalegyptianmuseum.org/advanced_result.aspx?category=02%2F0205%2F1&category=02%2F0211%2F2&category=02%2F0213%2F3&category=02%2F0215%2F4&material=&dating=&site=&god=&king=&letter=&person=&location=&inventory=&searchbutton=Search

The Karnak Great Hypostyle Hall Project. (n.d.). *Lebanon Tribute (H24, Plate 10 in OIP 107) - Image 5*. Retrieved November 2, 2014, from The University of Memphis: https://umdrive.memphis.edu/g-hypostyle/www/Sety_I_war_scenes/sety_1_wars%20%28265%29.jpg

The Museums Association. (2008). *Code of Ethics for Museums: Ethical Principals for All Who Work for or Govern Museums in the UK.* London: The Museums Association.

The Oriental Institute of The University of Chicago. (n.d.). *D017896: Mummified bundle in a wooden coffin*. Retrieved November 25, 2014, from The Oriental Institute of The University of Chicago Photo Archives: http://oi-idb.uchicago.edu/#D/PA/1537/H/1416942650811

The Wellcome Collection. (1921). *Christie, Manson & Woods - WA/HMM/CO/Ear/152:Box 36.* London: The Wellcome Collection.

The Wellcome Collection. (1936). *Sales - WA/HMM/CO/Sai/A.79:Box 209.* London: The Wellcome Collection.

The Wellcome Collection. (1937). *Robinson, Fisher & Harding - WA/HMM/TR/Pre/A.15:Box 415.* London: The Wellcome Collection.

The Wellcome Collection. (1939). *Harrods Ltd and Allsop & Co - WA/HMM/TR/Pre/A.8:Box 415.* London: The Wellcome Collection.

University College London. (2002). *Gods and Goddesses in Ancient Egypt: The Main Names at the Main Places*. Retrieved December 1, 2014, from Digital Egypt: http://www.ucl.ac.uk/museums-static/digitalegypt/religion/deitiesplaces.html

White, T., & Folkens, P. (2005). *The Human Bone Manual.* San Diego: Elsevier Academic Press.

Wilkinson, R. H. (1994). *Symbol & Magic in Egyptian Art.* London: Thames and Hudson Ltd.

Wyatt, J. (2012). Bird Identification from Art, Artifacts, and Hieroglyphs: An Ornithologist's Viewpoint. In R. Bailleul-LeSuer, *Between Heaven and Earth: Birds in Ancient Egypt* (pp. 83-90). Chicago: Oriental Institute of the University of Chicago.